

Sentence and Sentence Structure in the Analysis of Verbal Behavior

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Novel Sentences as the Functional Units of Language

Ever since Chomsky's (1959) review of Skinner's (1957) *Verbal Behavior* became compulsory reading for students of linguistics and cognitive psychology, it has been an article of faith among students of language, whether they are linguists, philosophers, or psychologists, not only that Skinner has nothing important to tell us about that topic, but that any attempt to construct a theory of language based on the principle that linguistic ability is acquired and maintained by the same process of operant reinforcement as we observe in the behavior of animals is doomed to failure. It is argued that there are two basic facts about language that a behaviorist theory cannot accommodate: (a) that the functional unit of language, the unit that must be complete before what is said by a speaker can be understood and responded to by a listener, is the sentence, and (b) that sentences are seldom repeated word for word and are typically constructed anew on each occasion of utterance.

There can be no doubt that these are genuine facts about language that any theory of language acquisition must explain. Moreover, although much of what Skinner has to say about the autoclitic in *Verbal Behavior* (1957) is an attempt to address the problem, that book contains no clear concept of the sentence and its structure, no explanation of why the single word utterance *Go!* is a complete sentence but the multiword strings *attends church regularly* and *the bald-headed man in the green jacket* are not, and no mention of

the remarkable abilities of the speaker to construct and the listener to construe intelligible sentences that neither party need have uttered or heard before. It follows that unless and until these defects in the analysis of verbal behavior proposed by Skinner are rectified, there is no hope of reversing the judgment that has been accepted as axiomatic by other students of language since Chomsky's review, and no prospect that the behaviorist theory of language acquisition will recover its rightful place as the only convincing explanation of that phenomenon. What follows is a dogmatically stated outline of my own solution to this problem.

Sentences as Discriminative Stimuli

A sentence is a discriminative stimulus in that it has the ability to orient the behavior of a listener who is a competent interpreter of the language in which it is formulated towards the possible instantiation at some time in the past, present, or future of a particular contingency or antecedent-behavior-consequence relationship.¹ Sentences are composed of elements in the shape of lexical words (nouns, verbs, adjectives, adverbs) whose semantic function typically derives

¹This way of formulating the function of a discriminative stimulus is designed to accommodate the observation of Adams and Dickinson (1981) that the actual response evoked in the aftermath of operant learning depends on the prevailing motivational or, to use Michael's (1982) term, *establishing* conditions, rather than on the valence of the consequences during learning. Any account of the role of sentences as discriminative stimuli needs to incorporate this feature in order to account for the fact that many sentences specify contingencies in a way that is neutral with respect to whether the consequences of the behavior in question are attractive (i.e., positively reinforcing) or aversive. This allows for the possibility that the speaker's meat is the listener's poison or vice versa.

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from a direct or indirect association between the word and the natural signs of the presence of an instance of the kind of thing the word stands for. But unlike standard cases of discriminative stimuli, a sentence as such need never be, and typically has never been, associated with the contingency to whose existence or availability it nevertheless alerts the listener. It follows that the ability of the speaker to construct and of the listener to construe such sentences frees the organism that possesses those abilities from the situation of a prelinguistic organism that can only respond on the basis of its genetic endowment and what it has learned from those contingencies it has personally encountered in the past.

The Picture Theory of Meaning

The ability of a sentence to act as a discriminative stimulus for the listener with respect to a contingency, the like of which he or she need never have experienced in his or her own case, depends on a combination of its *structure*, its *content*, and an *isomorphism* between that structure and content and the structure and content of the contingency or segment thereof which it thereby depicts or, to use Skinner's term, *specifies*.

The function of a sentence, *qua* discriminative stimulus, is to orientate the behavior of the listener to the possible instantiation of the contingency that it specifies. But few sentences specify all three terms of the contingency to whose presence or availability it alerts the listener. Two examples of sentences which do do this are my own (Place, 1983)

If the baby cries, give it a bottle and it will go back to sleep.

and John Austin's (1956/1961)

There are biscuits on the sideboard, if you want them.

Sentences of this kind are compounds of two conditionals: (a) a conditional imperative or ply (Zettle & Hayes, 1982)

If the baby cries, give it a bottle.

or

If you want biscuits, look on the sideboard.

which specifies the antecedent condition and the behavior to be performed under that

condition, and (b) a conditional declarative or track (Zettle & Hayes, 1982)

If you give the baby a bottle, it will go back to sleep.

or

If you look on the sideboard, you will find some biscuits.

which specifies the behavior and its consequence, thereby providing the incentive for complying with the imperative. Thus, the sentence as a whole breaks down into three *atomic sentences*:

Antecedent:

The baby cries.

You want biscuits.

Behavior:

You give the baby a bottle.

You look on the sideboard.

Consequence:

The baby goes back to sleep.

You find biscuits.

Situations and Atomic Sentences

Each of these atomic sentences specifies a contingency term. But because contingencies are defined relative to the organism whose behavior constitutes its middle term and because the primary function of language is interpersonal communication, we need a word for the kind of thing that constitutes a contingency term that does not presuppose any particular relationship to the behavior of any one individual. For this purpose I use Barwise and Perry's (1983) word *situation*.

A situation is either a state of affairs whereby a property of an object or a relation between two or more objects remains constant over a period of time or an event whereby a property of an object or a relation between two or more objects changes at a moment of time or over a period of time. An atomic sentence specifies a single simple situation in this sense.

As is evident from the definition of a situation I have given, a simple situation is composed of one or more objects (in the sense of that term in which a living organism is a species of object) and either a property of one object or a relation between two or more objects. In the sentence that depicts that situation, the property or relation is represented by the predicate or verb phrase. The object of which the property is a property or the objects between which the relation holds are

represented, respectively, by one or more than one noun phrase. Thus, the sentence *The book is red* consists of the monadic or one-place predicate or verb phrase *is red*, which ascribes the property of redness to an object referred to by the noun phrase *the book*, and thus specifies the state of affairs whereby that property belongs to that object. Likewise, the sentence *The cat is on the mat* consists of the two-place predicate or verb phrase *is on/is under*, which specifies a relation between two objects, those referred to by the noun phrases *the cat* and *the mat*, and thus specifies the state of affairs whereby that relation persists. Again, the sentence *John gave Mary a book* consists of the three-place predicate or verb phrase *give/receive*, which specifies a relation among three objects, those referred to by the noun phrases *John*, *Mary*, and *a book*, and thus specifies the event whereby those objects came into that relation to one another.

Conclusion

Needless to say, this is only a beginning. Even at the level of the simple atomic sentence there is a lot more to be said about the quantification structure of noun phrases that determines the range of possible cases to which the sentence applies, about the tense and aspect structure of verb phrases that locate the situation in time relative to the "now" of utterance, and about the various transformations (Place, 1992) whose effect is to alter the contingency perspective from which the same situation is viewed. But there, I am afraid, we must leave it. I hope I have said enough to convince you that sen-

tence structure is not, as Chomsky (1959) would have us believe, the product of a set of abstract rules arbitrarily imposed on language by the brain. It is a structure imposed on language by the structure of the environment and by the need to represent, through the structure and content of a sentence, aspects of that structure that would not otherwise be accessible to the listener. I hope that in so doing I have also persuaded you that sentences and their structure need not be, and indeed must not be, regarded as they have tended to be in the recent past, as a no-go area for the analysis of verbal behavior.

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